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# Inconsistency in listing time-dependent $\gamma$ in ENSDF

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On page 27 and 28

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# Guidelines for Evaluators

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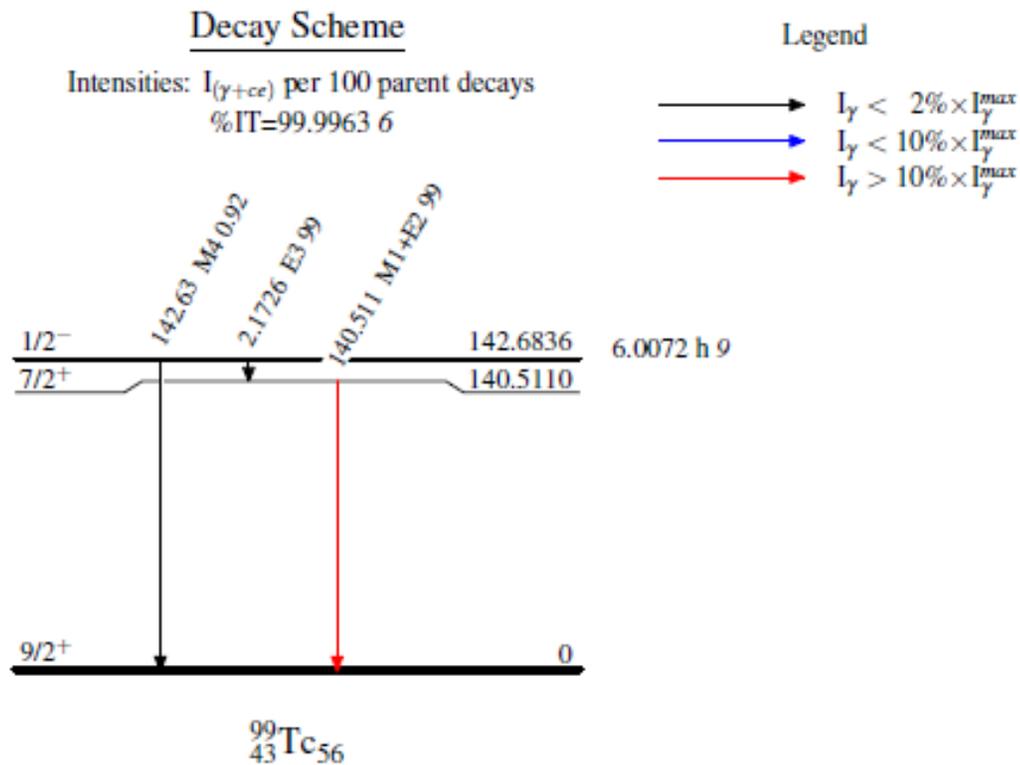
$I_{\gamma}$ ,  $I_{\gamma+c}$

6. The RI and/or TI field **should be left blank** for a transition that deexcites an isomeric state in the daughter nucleus if the isomeric  $T_{1/2}$  value is such that the intensity is time-dependent. A comment should be included giving the % feeding of the isomer, and a comment is also needed to explain why the intensity is missing. The intensities can be given in a separate IT decay dataset.

# Guideline followed: An example

$^{99}\text{Mo}$   $\beta^-$  decay (65.9 h) and  $^{99}\text{Tc}$  IT decay (6.0 h)

$^{99}\text{Tc}$  IT decay (6.0072 h)



# <sup>99</sup>Mo β<sup>-</sup> decay (65.9 h)

<sup>99</sup> Mo β <sup>-</sup> decay 1992Go22 (continued)								Author	Citation
								E. Browne, J. K. Tuli	NDS 145, 25 (2017)
								γ( <sup>99</sup> Tc) (continued)	
$E_{\gamma}^{\dagger}$	$I_{\gamma}^{\ddagger\alpha}$	$E_i(\text{level})$	$J_i^{\pi}$	$E_f$	$J_f^{\pi}$	Mult. $\&$	$\alpha^{@b}$	Comments	
140.511 1		140.5110	7/2 <sup>+</sup>	0	9/2 <sup>+</sup>	M1+E2	+0.129 35	<p><math>E_{\gamma}</math>: from curved-crystal measurement (1981He15); value adopted in 2000He14.  Others: E=140.512 4 (1972Ga37), 140.511 6 (1969Co18), 140.466 15 (1990Me15).  <math>I_{\gamma}</math>: <math>E_{\gamma}</math>=140.511, <math>I_{\gamma}</math>=744 11, from <math>I_{\gamma}</math>=704 45 (1969Co18), <math>I_{\gamma}</math>=730 (1974HeYW),  <math>I_{\gamma}</math>=743 19 (1978MoYU), <math>I_{\gamma}</math>=747 12 (1980Di16), <math>I_{\gamma}</math>=759 20 (1980Ya10), <math>I_{\gamma}</math>=686  49 (1982Si16), <math>I_{\gamma}</math>=752 28 (1985Ch42), <math>I_{\gamma}</math>=755 26 (1990Me15), and <math>I_{\gamma}</math>=739 11  (1992Go22). recommended in 2014Ch12.  <math>I_{\gamma}</math>: <math>I_{\gamma}(140.5)</math>=744 11 x 0.1220 16=90.8% 2, per 100 decays of <sup>99</sup>Mo in equilibrium  with <sup>99</sup>Tc(6.0 h). Uncertainty of 0.2% is due to the covariant relation between the  relative γ-ray intensity (744) and the normalization factor (0.1220), the latter  deduced from the decay scheme by evaluators .  Additional information 2.  δ: unweighted average of +0.118 6 from γγ(θ) (1974Ga01), 0.194 33 from α(exp),  and 0.07 7 from α(K)exp; 0.31 2 (1982Si16).  Mult.: α(K)exp: weighted average of 0.093 6, 0.096 6 (both 1971Vo06), 0.094 8  (1969Vu03), and 0.104 7 (1968Va14); α(exp): weighted average of 0.118 3  (1973Le29), and 0.122 5 (1969Vu03).  α(K)=29.1 4; α(L)=9.06 13; α(M)=1.774 25  α(N)=0.269 4; α(O)=0.01069 15  <math>E_{\gamma}</math>: From 1990Me15 and 1978MeZK.  <math>I_{\gamma}</math>: <math>I_{\gamma}</math>=0.183 11, from <math>I_{\gamma}</math>=0.195 40(1968Va14), <math>I_{\gamma}</math>=0.149 29 (1980Di16), and  <math>I_{\gamma}</math>=189 11(1990Me15), recommended in 2014Ch12.  <math>I_{\gamma}</math>: 0.15 2 from <math>I_{\gamma}(142.6)/I_{\gamma}(140.5)</math>=0.00020 2 in equilibrium deduced from</p>	
142.675 25		142.6836	1/2 <sup>-</sup>	0	9/2 <sup>+</sup>	M4	40.2		

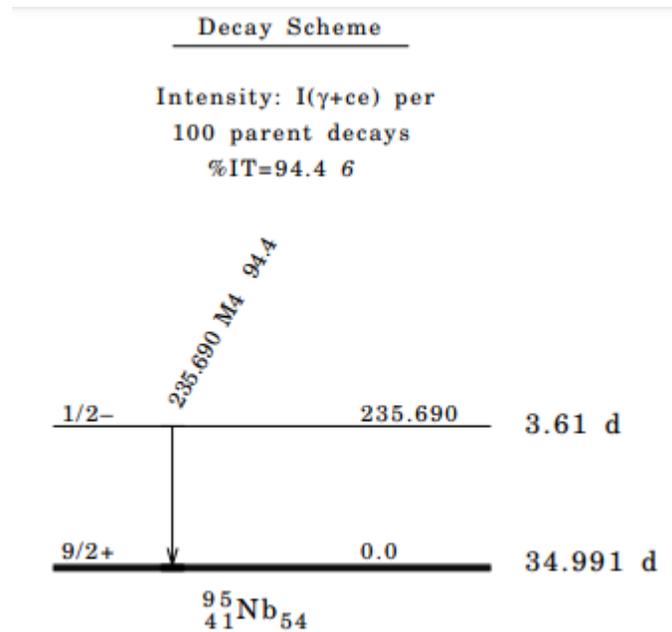
Guideline followed (another example): 135I B- DECAY (6.57 H) and 135XE IT DECAY (15.29 M)

# Guideline not followed: An example

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$^{95}\text{Zr}$   $\beta^-$  decay (65.0 d) and  $^{95}\text{Nb}$  IT decay (3.61 d)

## $^{95}\text{Nb}$ IT Decay (3.61 d)



# $^{95}\text{Zr}$ $\beta$ - decay (64.0 d):

$\gamma(^{95}\text{Nb})$       2010Ba39      Citation  
NDS 111, 2555 (2010)

$\alpha(\text{K})_{\text{exp}}$  From 1969Br29. Others:  $\alpha(\text{K})_{\text{exp}}(235\gamma)=1.67\ 13$  and  $\alpha(\text{K})_{\text{exp}}(724\gamma)=0.00123\ 6$  from  $\text{ce}(\text{K})$  of 1974An22 and  $I_\gamma$  of 1975De17 assuming  $\alpha(\text{K})(757\gamma)=0.00120$ . See also  $^{95}\text{Nb}$  IT decay (86.6 h).

$E_\gamma^\dagger$	E(level)	$I_\gamma^\S$	Mult. $^\ddagger$	$\alpha$	Comments
235.69 2	235.690	0.27 2	M4	2.79	$\alpha(\text{K})_{\text{exp}}=2.21\ 27$ . $I_\gamma: I_\gamma(235)/I_\gamma(756)=0.49\ 6$ from Limitation of Relative Statistical Weight, LRSW, analysis (1985ZiZY,1992Ra09) of the six values 0.34 13 (1969Br29), 0.6 2 (1969Fo01), 0.4 1 (1972Er08), 0.67 7 (h. H. Hansen et al., 1973, as quoted in 1975De17), 0.54 3 (1975De17), and 0.43 2 (1976Ho04). This analysis increases the uncertainty of the value of 1976Ho04 from 0.02 to 0.026 to reduce its relative weight from 63% to 50%. The resulting internal uncertainty is

- Other examples ( $I_\gamma$  listing guideline is not followed):
- $^{85}\text{Y}$  EC Decay (2.68 h) and  $^{85}\text{Sr}$  IT Decay (1.127 h)
- $^{111}\text{Sn}$  EC Decay (35.3 m) and  $^{111}\text{In}$  IT Decay (7.7 min)
- $^{115}\text{Cd}$   $\beta$ - Decay (53.46 h) and  $^{115}\text{In}$  IT Decay (4.486 h)

## Possible reasons and need:

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- Often data listing remains the same as that of the previous evaluation
- Difficult to remember – since these cases are infrequent
- Most likely the rule was introduced between 1974 and 1986
- **Need:**  
Better to fix the ly listing throughout the database as a special item  
(horizontal fixing)